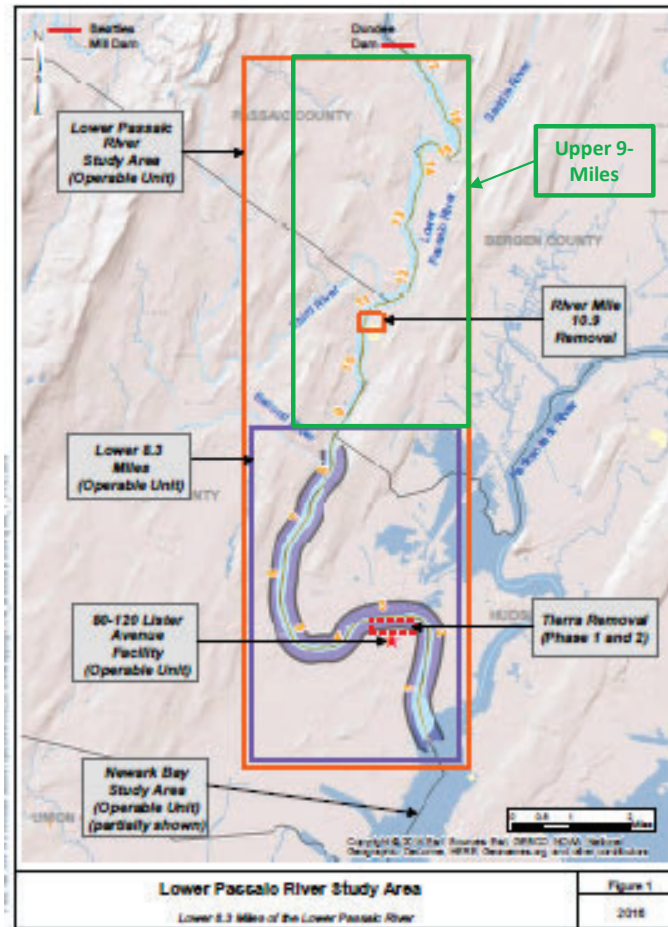


# Lower Passaic River: A Plan to Expedite Cleanup of the Upper 9-Miles

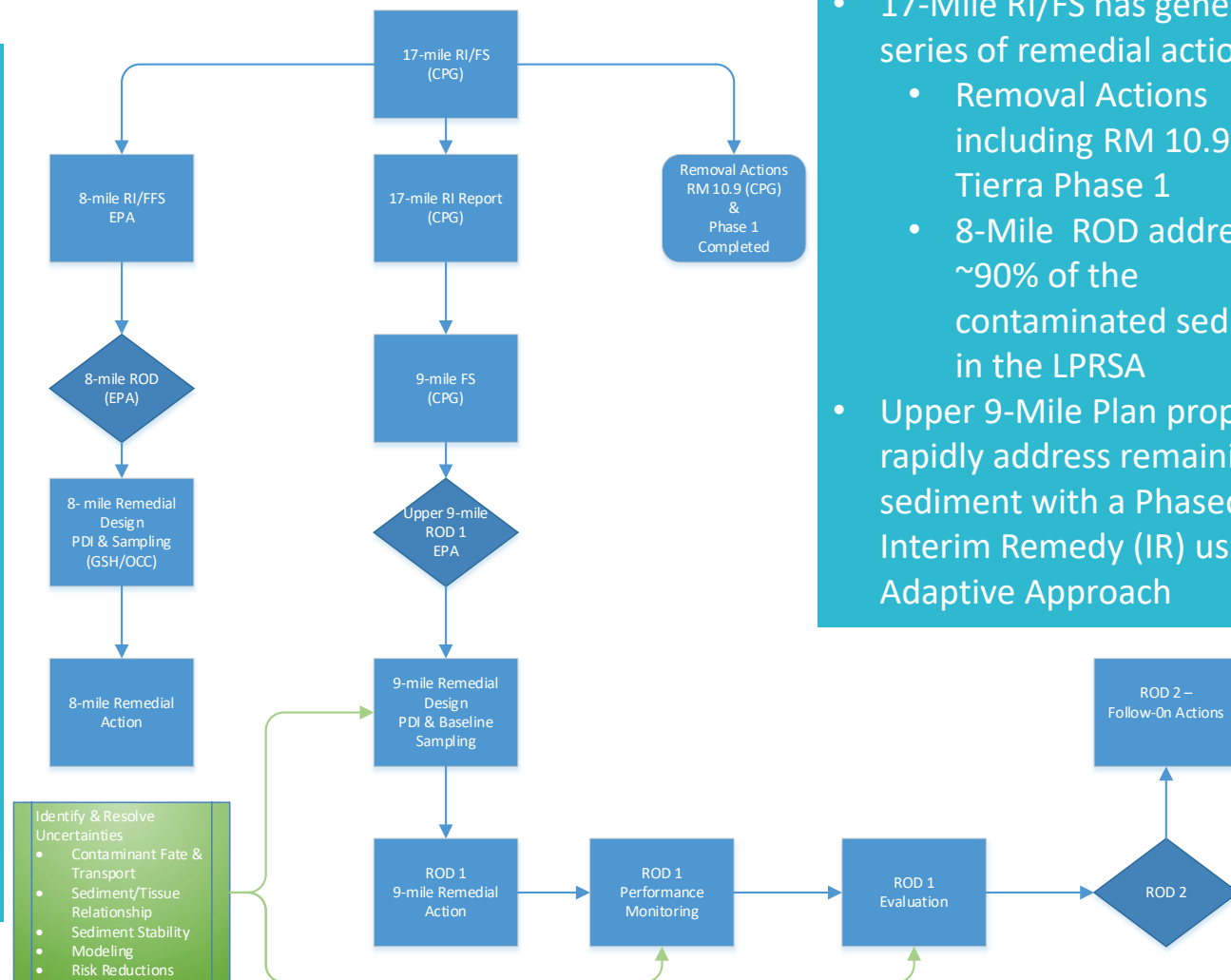
December 1, 2017

# Diamond Alkali Superfund Site



- OU1 – 80-120 Lister Avenue Facility
  - Addressed by the 1987 ROD; completed in 2004
  - Interim containment remedy, which consists of capping, subsurface slurry wall and flood wall, and a groundwater collection and treatment system
- OU2 - Lower 8.3 Miles of the Lower Passaic River Study Area
  - March 2016 ROD selected a remedy to address the sediments of the lower 8.3 miles
  - Most contaminated segment of the river and a primary ongoing contaminant source to the rest of the LPR and Newark Bay.
- OU3 – Newark Bay Study Area RI/FS
- OU4 – 17-mile Lower Passaic River Study Area
  - Upper 9-mile Plan proposes a phased remedy to rapidly address sediment through a interim remedy that relies on adaptive management
  - Includes completing the 17-mile RI Report and an FS that evaluates Upper 9-mile remedial alternatives and acknowledges the Lower 8-mile ROD

# How the Upper 9-Mile Plan Completes the 17-Mile LPRSA Remedial Actions



- 17-Mile RI/FS has generated a series of remedial actions
  - Removal Actions including RM 10.9 & Tierra Phase 1
  - 8-Mile ROD addresses ~90% of the contaminated sediment in the LPRSA
- Upper 9-Mile Plan proposes to rapidly address remaining sediment with a Phased Interim Remedy (IR) using an Adaptive Approach

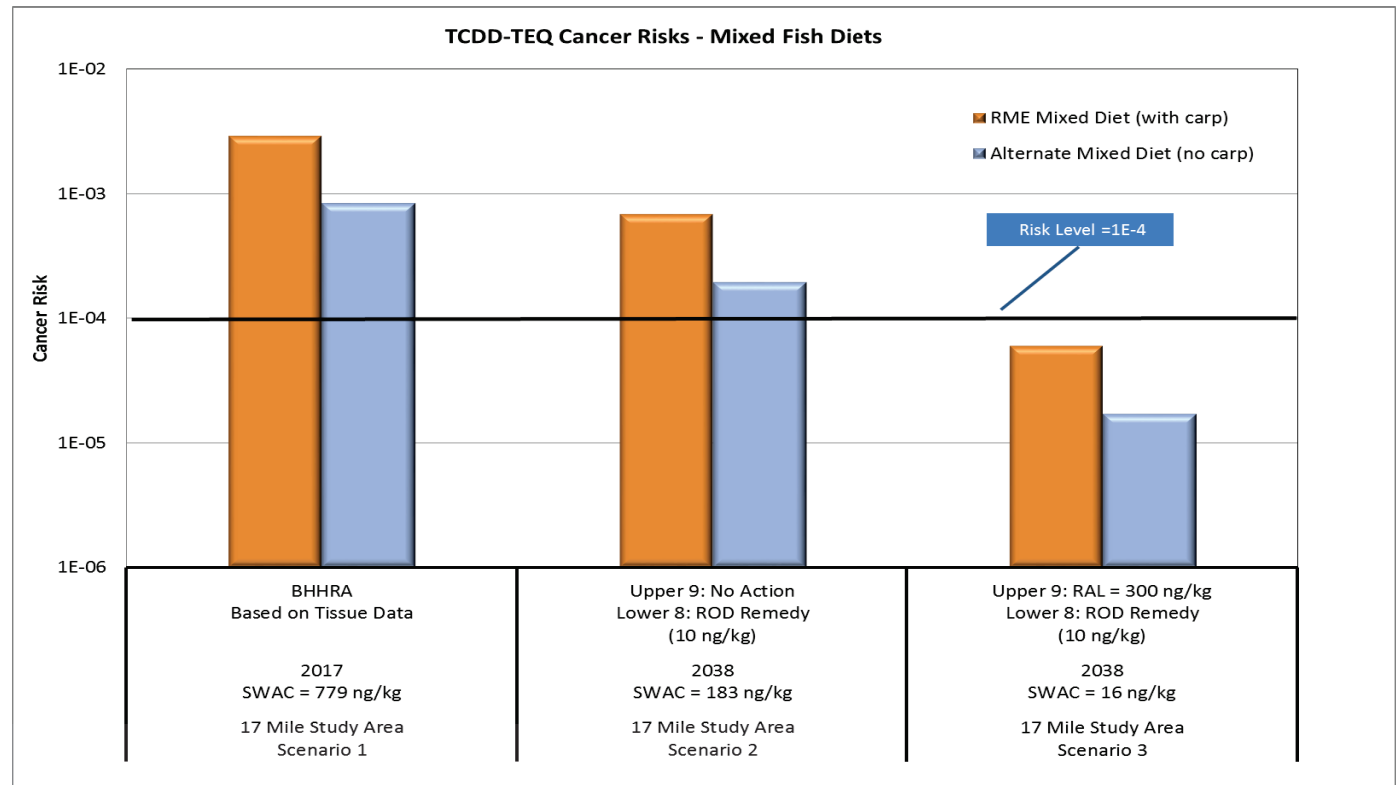
# The CPG Plan: An Overview

## Using Adaptive Management in the Upper 9-Miles

- ROD 1 – Interim Remedy (IR) to remove Source Areas Posing the Greatest Risks or Preventing the Rest of the River from Recovering (ROD 1)
  - 2,3,7,8-TCDD Sediment SWAC reduced by ~90% following Phase 1 IR
  - Total PCBs reduced below background
- Monitor Fish, Crab, Water and Sediment to Confirm the IR & Monitored Natural Recovery (MNR) are Working (Performance Monitoring)
  - Model projections suggest that fish consumption risks reduced to below  $10^{-4}$  in ~10 years
  - An estimated reduction of 90% for fish and avian ecological HQs in the same period
- ROD 2 - Go Back Into the River and Do More if Needed or Set Final Cleanup Levels if River is Recovering as Predicted

Threshold  
Issue:  
Phase 1 IR &  
MNR expected  
to be  
Protective

## TCDD Risks: Current versus Post-Lower 8-Mile Remedy & Upper 9-Mile IR & MNR in 2038



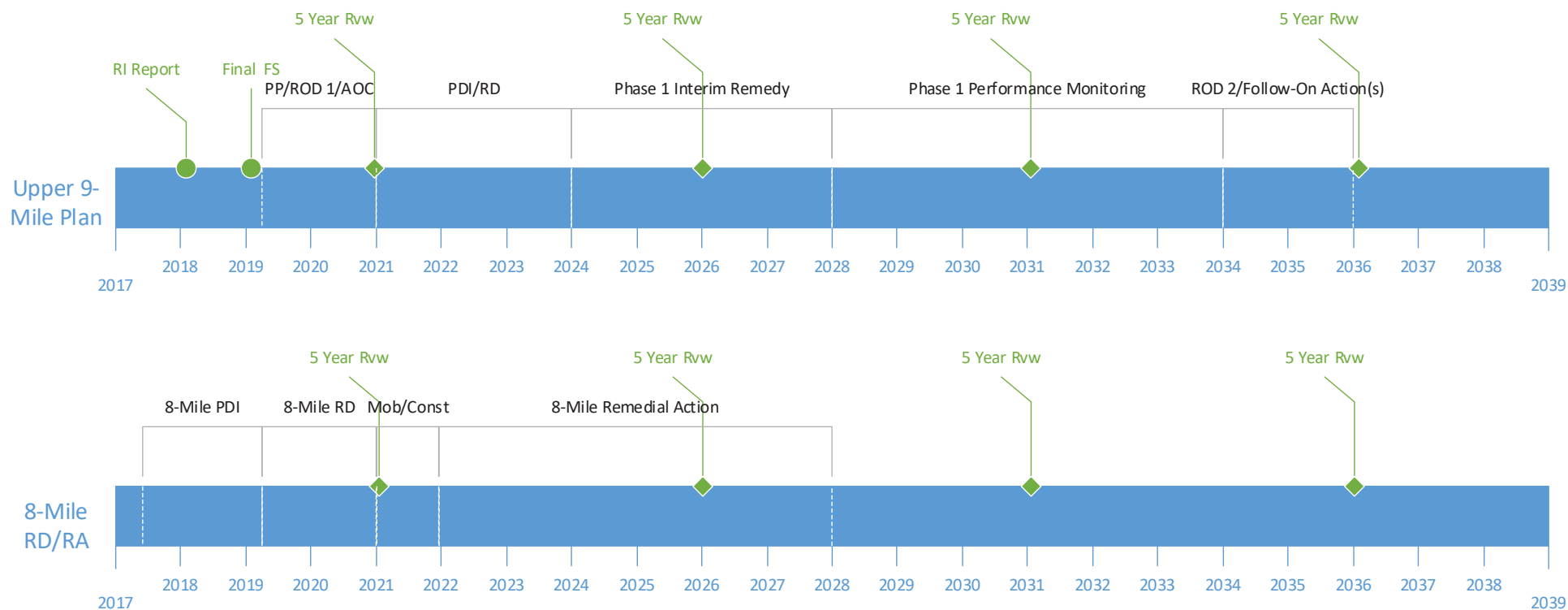
## CPG's Proposal for an Upper 9- Mile Phase 1 IR

- Phased approach to address the Upper 9-Miles using Adaptive Management
- Proposed RAL of 300 ppt (ng/kg) TCDD and 1 ppm (mg/kg) of Total PCBs
- Approximately 80 Acres from RM 8.3 to RM 14.7
- Remedial Footprint will be reassessed after the PDI
- RD will include refined modeling projections for sediment and tissue recovery
- Performance Monitoring will be used to determine whether the Phase 1 IR and MNR are sufficient and ROD 2 can codify the final cleanup levels, or whether additional actions are required to achieve protectiveness

## Potential Results of the Upper 9-Mile Plan – Phase 1 IR & MNR

- Proposed Phase 1 IR & MNR are likely to achieve protectiveness when combined with Lower 8.3 Mile Remedial Action (RA)
- Allows coordination with Lower 8-mile RA
- The entire 17-miles will be addressed years sooner potentially completing the active clean-up in the mid-to-late 2020s:
  - Lower 8.3-Mile RA
  - Upper 9-Mile IR
- Iterative nature of Adaptive Management provides certainty of meeting final risk goals

# Upper 9-Mile IR Coordinated with 8-Mile RA Cleans Entire 17-Miles Sooner



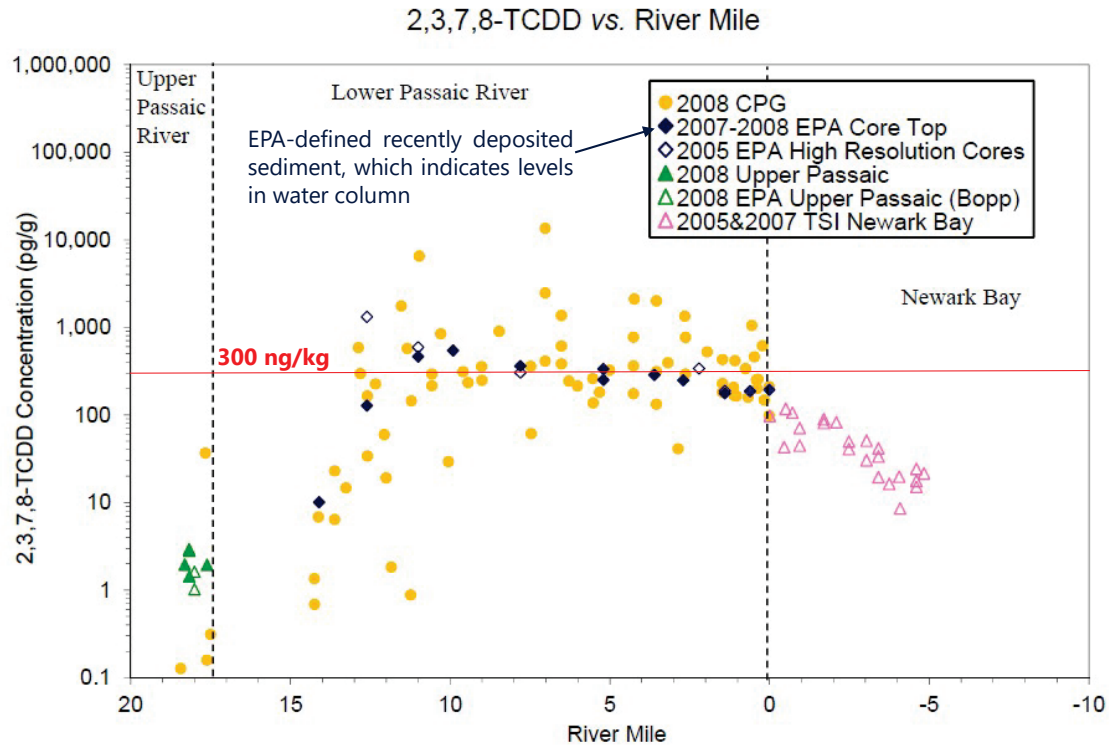
## Conceptual Site Model Elements Regarding Sediment Recovery Provide Guidance for Phase 1 Interim Remedy

- At locations of fine sediment with surface concentrations much higher than on depositing particles:
  - Net deposition responsible for the COPCs being there in the first place has likely slowed or stopped
- At locations of fine sediments with surface concentrations matching those of depositing particles:
  - Net deposition likely has continued
- At locations of coarser sediments, which typically have concentrations lower than those of depositing particles:
  - Concentrations likely reflect the net result of erosion and deposition of the fine fraction
  - Erosion and deposition at these locations will cause concentrations to be impacted by the concentrations on depositing particles

## Upper 9-Mile Plan Phase 1 IR - Basis

- Actively remediate sediments that inhibit recovery
- Allow areas with good recovery potential to respond to the substantial reduction in concentrations achieved by remediating source areas
- Areas subject to significant net deposition and areas subject to cyclic erosion and deposition have the potential for recovery and have COPC concentrations that reflect the concentrations on recently deposited sediments originating from the water column

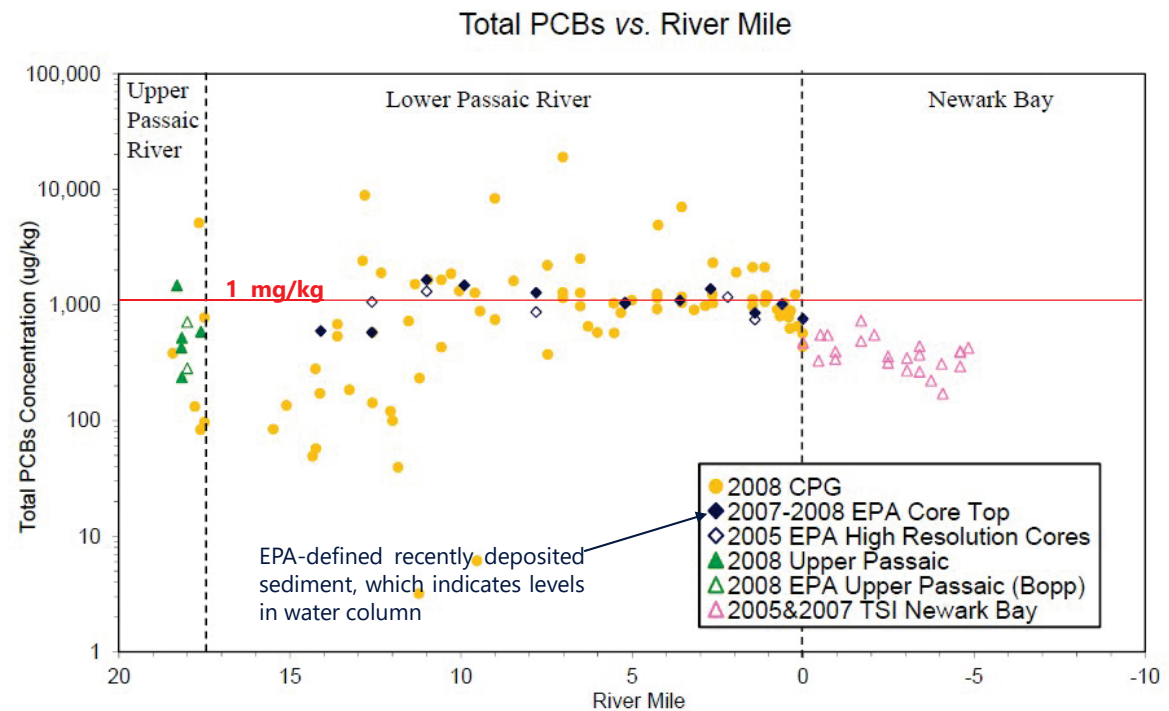
Depositing  
Particle 2,3,7,8-  
TCDD  
Concentrations  
Roughly 200  
ng/kg to 400  
ng/kg



"...2,3,7,8-TCDD concentration in recently-deposited sediments vary less than a factor of 3 from RM 2 to RM 12 (note in blue diamonds on the upper diagram in Figure 4-3)." – FFS RI Report at Page 4-3.

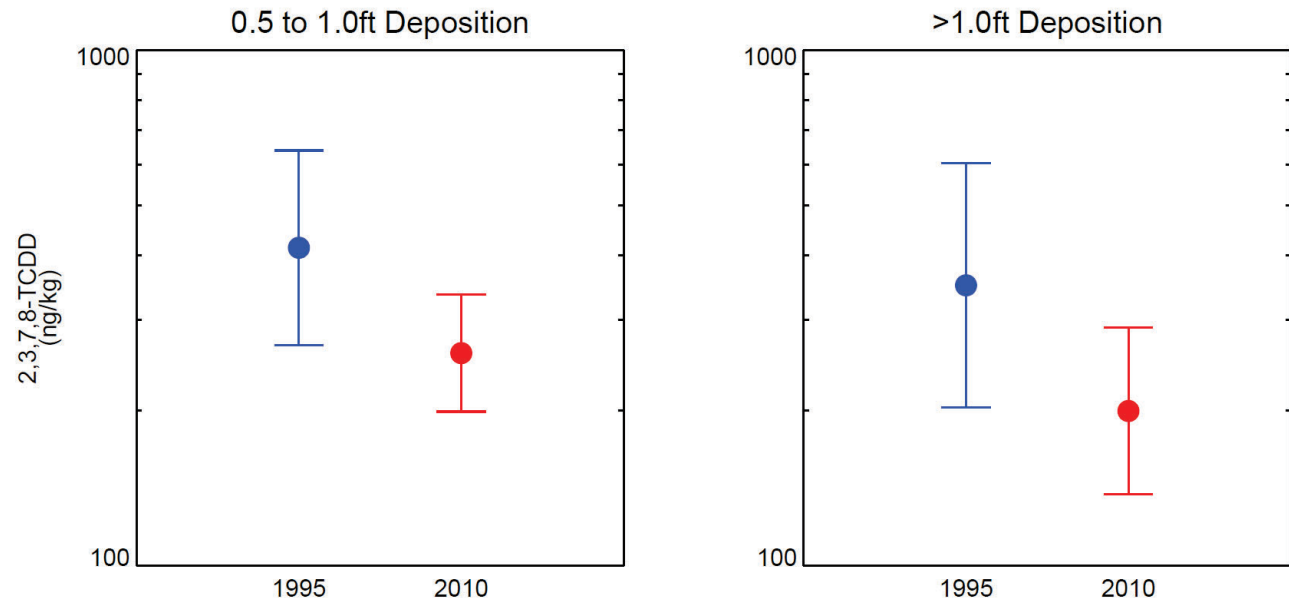
Water Column 2,3,7,8-TCDD Particulate  
Concentrations at RM 10.2 (from HV-CWCM)  
180 ng/kg and 340 ng/kg

Depositing  
Particle Total  
PCB  
Concentrations  
Roughly 0.7 to  
1.5 mg/kg



Water Column Total PCB Particulate Concentrations at  
RM 10.2 (from HV-CWCM)  
0.7 mg/kg and 0.9 mg/kg

# Evidence of Recovery in Lower 8 Mile Depositional Areas

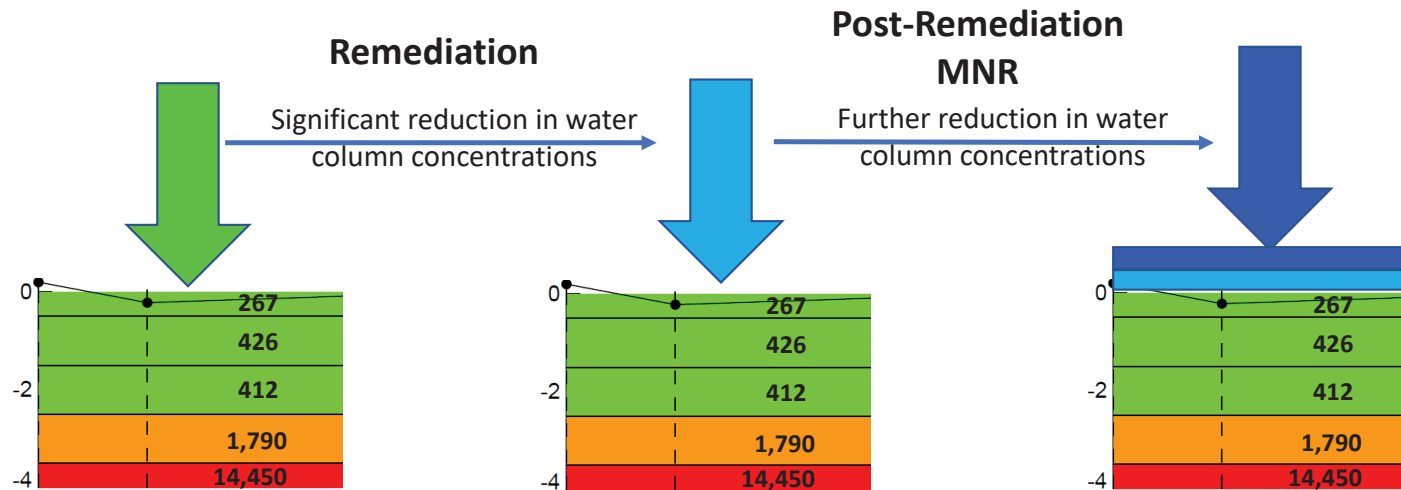


Plot shows the arithmetic average calculated in natural log space with  $\pm$  two standard errors for data collected between RM 1 and RM 7. The 1995 dataset includes data collected between 1995 – 1999 and the 2010 dataset includes data collected between 2005 – 2013. Differences between 1995 and 2011 bathymetry surveys were used where available. Outside the coverage of the 2011 bathymetry data, differences between 1995 and 2007 bathymetry surveys were used.

## Knowledge of Recovery Mechanisms Allows Prediction of Post- Remediation Recovery

- Burial via net deposition
  - Applies to most areas with surface sediment 2,3,7,8-TCDD concentrations in the range of 200 to 400 ng/kg
- Exchange of fine sediment component of coarse sediments via alternating deposition and erosion
  - Applies to areas with surface sediment 2,3,7,8-TCDD concentrations less than 200 ng/kg

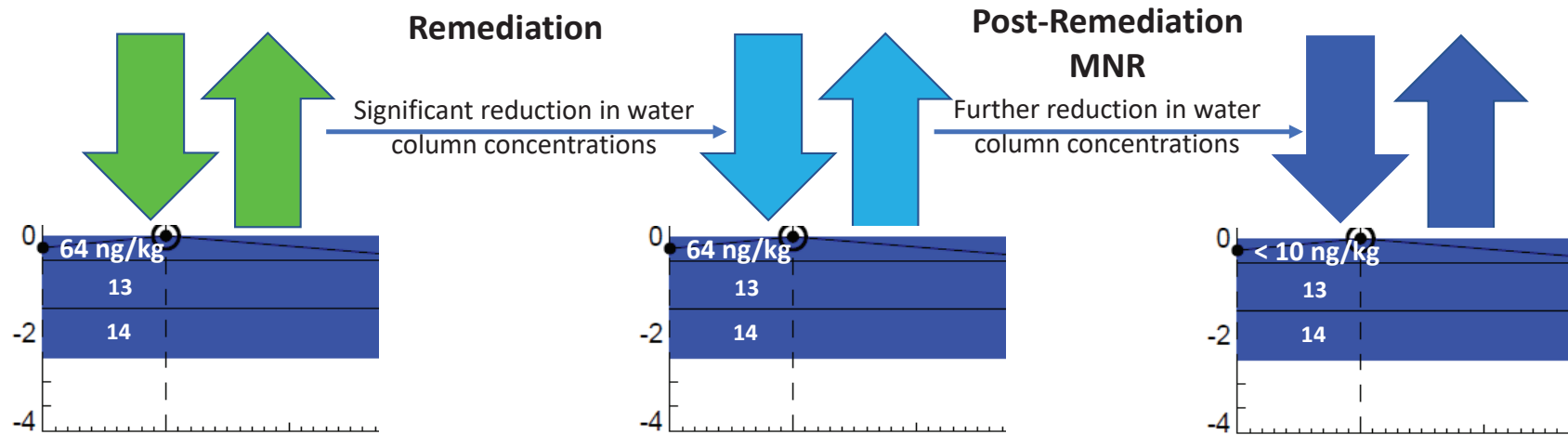
# Recovery Via Net Deposition



RM 10.68 Core 11B-0302

# Recovery Via Erosion and Deposition in Coarse Sediments

Location mapped as Gravel and Sand



RM 7.97 Core CLRC-051

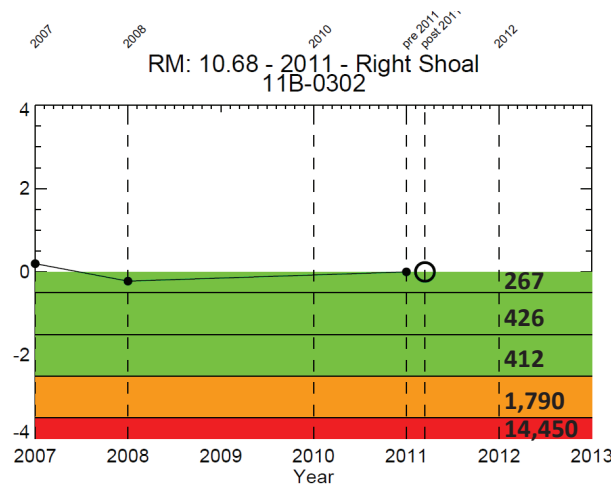
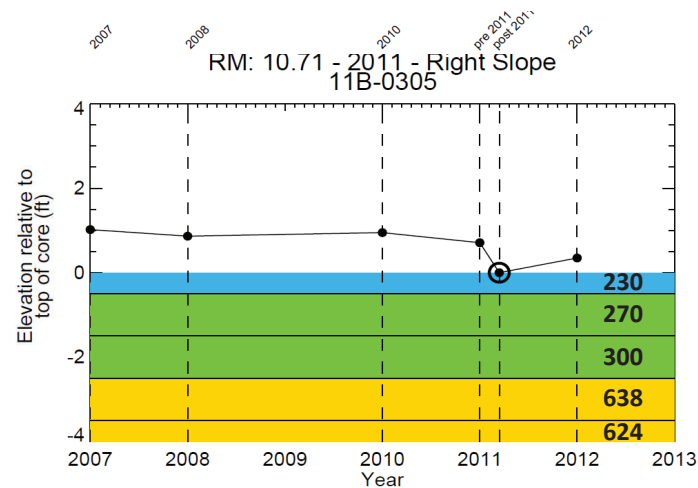
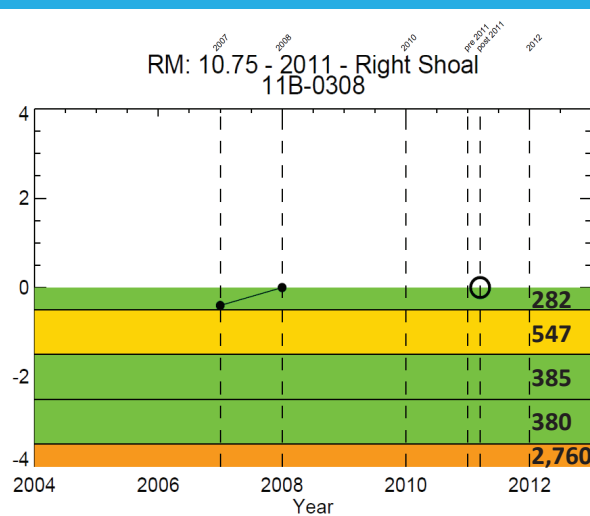
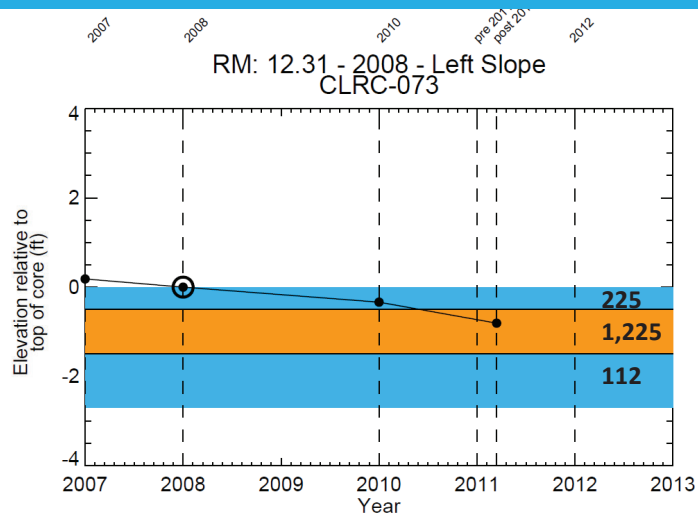
Recovery  
Potential at  
Locations with  
2,3,7,8-TCDD of  
200 ng/kg to 300  
ng/kg was  
Evaluated to  
Validate  
Recovery  
Mechanisms

- 12 such cores collected between RM 8 and RM 12.5
- Indicators of recovery potential
  - More than one layer with concentrations in the 200 ng/kg to 400 ng/kg range indicative of deposition
  - No indication of significant erosion at the location
    - Recognizing that Hurricane Irene occurred in 2011 ( 90 year event)
  - Absence of subsurface contamination – location of temporary deposition

# Results of Evaluation Support (or Validate) Recovery and Phase 1 IR

- Summary of findings
  - 10 of 12 locations show recovery potential
    - 7 locations have more than one layer with concentrations in the 200 ng/kg to 400 ng/kg range
    - 2 locations have higher concentrations below the surface layer but only modest bathymetric changes despite high flow events
    - 1 location has no subsurface contamination – temporary deposition
  - 2 locations would be remediated in Phase 1 based on vulnerability to erosion
- Recovery despite unusually frequent high-flow events that would tend to mask longer term recovery potential
  - 2007-2011 included 4 events with peak daily average flow of about 15,000 cfs or more at Little Falls
  - Only one such event in the prior 27 years

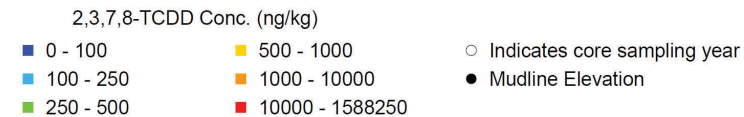
# Bathymetry Temporal and Vertical 2,3,7,8-TCDD Profiles for Cores With 200 ng/kg to 300 ng/kg in the Top 0.5 ft



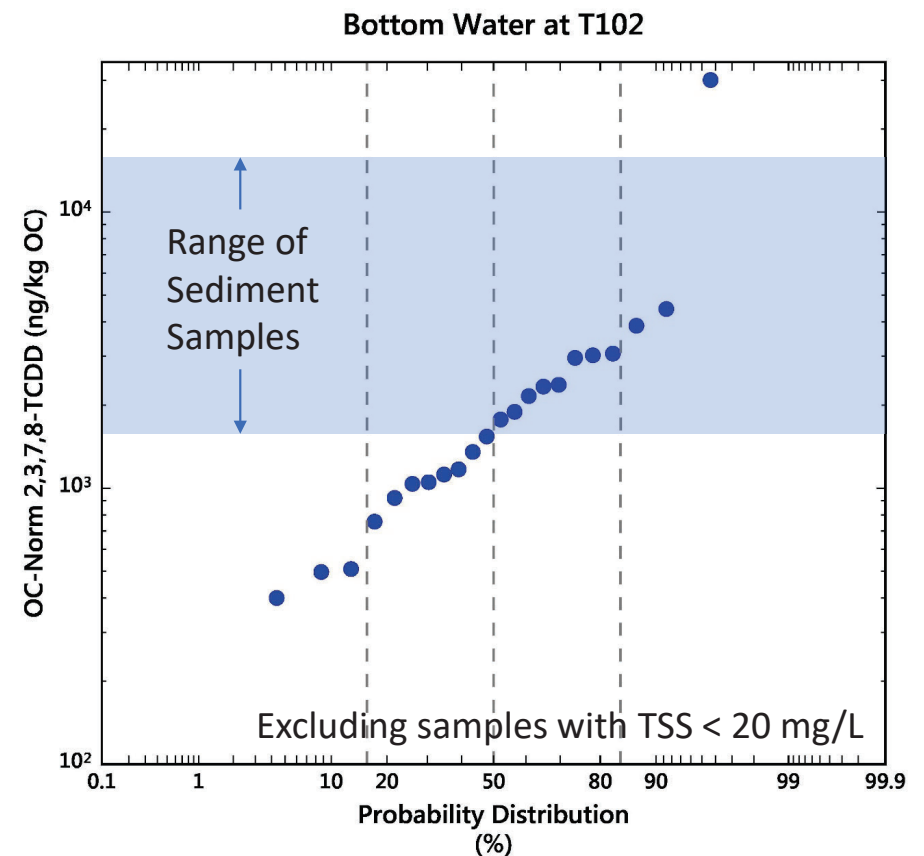
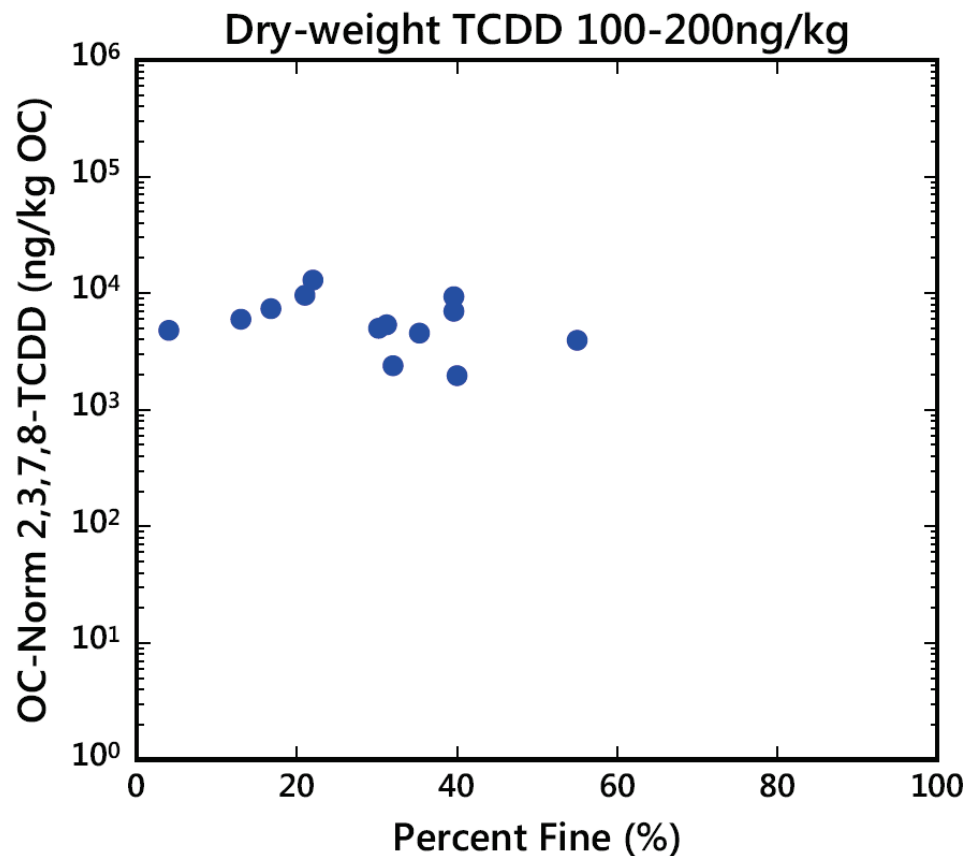
- Three of the 7 cores with evidence of ongoing deposition because of multiple layers in the range of water column particulates
- One (upper left) of two cores that is vulnerable to erosion and would be targeted for removal

## Note:

- lines and points indicate core surface elevation relative to elevation in the year of collection
- Numbers are ng/kg in each layer



# Locations with 100-200 ng/kg of 2,3,7,8-TCDD Exhibit Similar Carbon-Based Concentrations that Suggest a Close Connection to Water Column Particulates

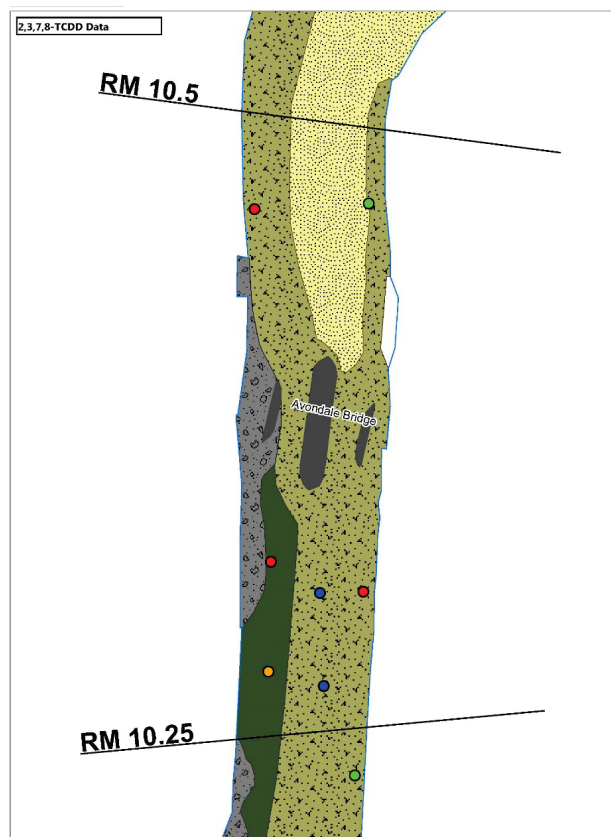


## Evaluation of Remediation and its Effectiveness Conducted Using Concentration Distributions Predicted by Geostatistics

- Kriging used to quantify uncertainty in interpolated concentrations
- Conditional simulation used Kriging uncertainty estimates to generate 100 maps of sediment COPC distributions, each of which honor the data and the spatial correlation estimated from the data
- A single map designated as CS37 has been agreed for modeling purposes to be used to estimate the magnitude of remedial foot print triggered by the RALs and the concentration reductions that would be attained by that remediation

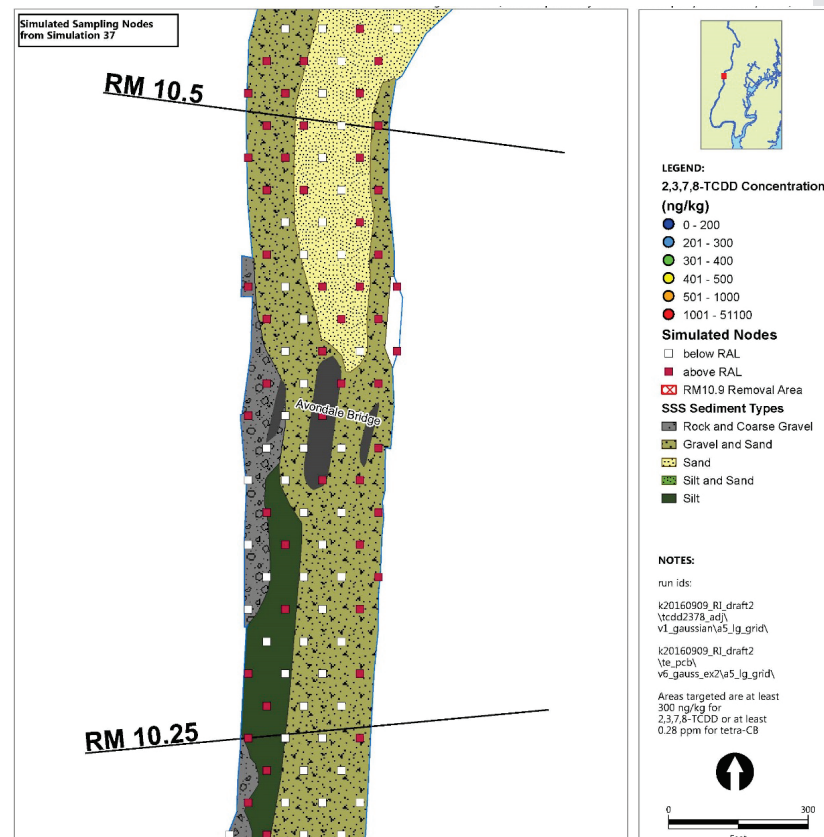
Conditional  
Simulation  
Evaluation –  
100  
simulations  
performed,  
EPA approved  
CS 37 for  
model input

Data on Which Maps are Based



Publish Date: 2017/08/15, 8:48 PM | User: athenaoldson  
Filepath: H:\Passaic\_CPD\ANALYSIS\Sed\_Char\Interpolations\k20160909\_R0\_draft2\maps\tcdd2378\_adj\vl1\_gaussian\45\_lg\_grid\2\_panel\_center-point\_dots\_TCDD\_SSS\_v2.mxd

CS37 Interpolation – Red at or Above RAL

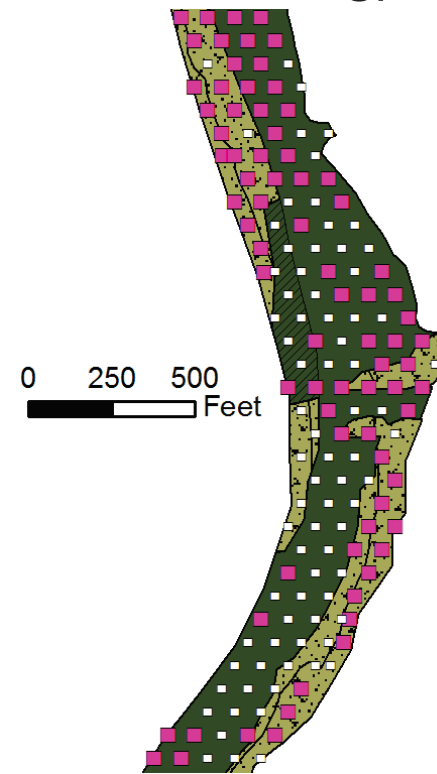


Each CS Yields  
a Different  
Map – High  
density pre-  
design  
sampling will  
**reduce** the  
uncertainty

Simulation 1



Simulation 37



0 250 500  
Feet

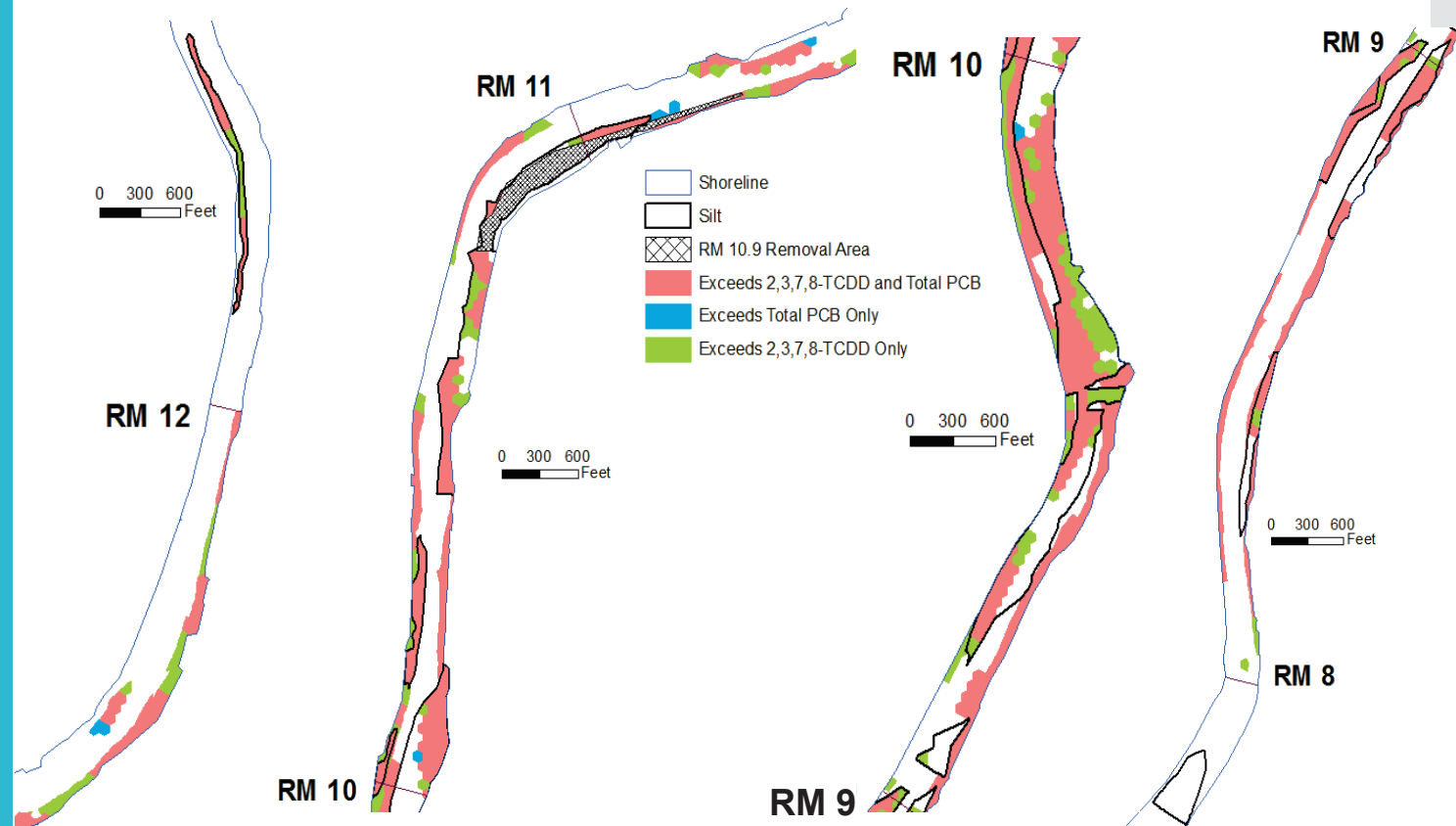
**Simulated Nodes**

- Below RAL
- Above RAL

**SSS Sediment Types**

- Rock and Coarse Gravel
- Gravel and Sand
- Sand
- Silt and Sand
- Silt
- Expanded Silt Areas

# Areas Targeted Using CS37 (area above RM 12.5 not shown for convenience)



RM 8 = RM 8.3 in the RM system  
adopted for the FFS

# Variable RALs Evaluated at EPA's Request: Range of Phase 1 Footprint based on Variable RALs

2,3,7,8-TCDD RAL (ng/kg)				RM 8-14.7 Acreage	
Limited Deposition/ Some Erosion	Erosion > 6 inches	Direct Contact Areas	Other Areas	CS 37	Range of All CS Runs
300	300	300	300	83	67 - 94
250	250	300	300	84	70 - 96
200	200	300	300	86	72 - 99
200	200	300	500	84	71 - 97
200	200	250	500	85	72 - 98
200	200	200	300	89	75 - 102

2,3,7,8-TCDD RAL (ng/kg)			RM 8-14.7 Acreage	
Shoals	Erosion > 6 inches	Other Areas	CS 37	Range of All CS Runs
200	300	300	87	73 - 99
200	200	300	87	73 - 100
200	200	500	85	71 - 96

Note: Statistics being revised to reflect discussions with EPA on how remedial areas are set for the various categories

# Post-Remedy SWACs and Percent Reductions based on Variable RAL Evaluation

2,3,7,8-TCDD RAL (ng/kg)				RM 8 - 14.7				RM 8 – 17.4			
Limited Deposition/ Some Erosion	Erosion > 6 inches	Direct Contact Areas	Other Areas	2,3,7,8-TCDD		Total PCB		2,3,7,8-TCDD		Total PCB	
				SWAC	Percent Reduction	SWAC	Percent Reduction	SWAC	Percent Reduction	SWAC	Percent Reduction
300	300	300	300	84	91.5	0.30	79.7	62	91.5	0.29	74.7
250	250	300	300	82	91.7	0.30	80.0	60	91.7	0.29	75.0
200	200	300	300	79	92.0	0.29	80.4	62	91.5	0.29	74.7
200	200	300	500	87	91.2	0.30	79.8	64	91.2	0.29	74.8
200	200	250	500	82	91.7	0.29	80.2	60	91.7	0.29	75.2
200	200	200	300	71	92.8	0.28	81.2	52	92.8	0.28	76.2

2,3,7,8-TCDD RAL (ng/kg)			RM 8 - 14.7				RM 8 – 17.4			
Shoals	Erosion > 6 inches	Other Areas	2,3,7,8-TCDD		Total PCB		2,3,7,8-TCDD		Total PCB	
			SWAC	Percent Reduction	SWAC	Percent Reduction	SWAC	Percent Reduction	SWAC	Percent Reduction
200	300	300	70	92.9	0.28	81.1	52	92.9	0.28	76.0
200	200	300	70	92.9	0.28	81.1	51	92.9	0.28	76.1
200	200	500	74	92.6	0.29	80.6	54	92.6	0.28	75.6

All PCB results are below ROD background of >0.4 mg/kg

Note: Statistics being revised to reflect discussions with EPA on how remedial areas are set for the various categories

## Variable RAL Analysis Found No Significant Difference Between Alternatives

- Analysis Supports Use of 300 ng/kg RAL
  - 300 ng/kg RAL reduces concentrations more than ten-fold
  - Reducing RAL to 200 ng/kg in areas with certain characteristics achieves little additional benefit
    - Targets cores showing recovery potential
    - Produces unmeasurable changes in SWAC
      - mostly < 10 ng/kg
  - 300 ng/kg RAL is already conservative
    - Could raise to 400 ng/kg since water column concentrations 200 – 400 ng/kg

## Current RI Data Limit the Ability of Identifying Flexible RALs

- Current RI data is insufficient to demonstrate the benefits of flexible RAL approach
- Flexible RAL options do little to reduce risk, but the increase in volume and cost are significant.
- PDI investigation will be designed to develop data set to improve models and allow a more robust evaluation of flexible RALs.
- Models suffice for FS level evaluation

## Range of Post-Remediation SWACs Within Range of Data Uncertainties

- CS 37 is One of 100 Conditional Simulations
    - +/-25% for total footprint acreage
    - Final footprint will be based on PDI results
  - Current data set and tools are not refined sufficiently to determine the difference between 40, 30, 20 or 10 ng/kg
  - Numerous Uncertainties in Sediment to Tissue Relationships
- 
- Post-Remediation/Recovery SWACs are equivalent within accuracy of data
  - Only mechanism to evaluate effectiveness is to conduct Phase 1 Interim Remedy and monitor: Adaptive Management

# EPA Evaluated Potential Recovery Following Phase 1 IR & MNR in 2038

## HDR Prediction Results - September 11, 2017

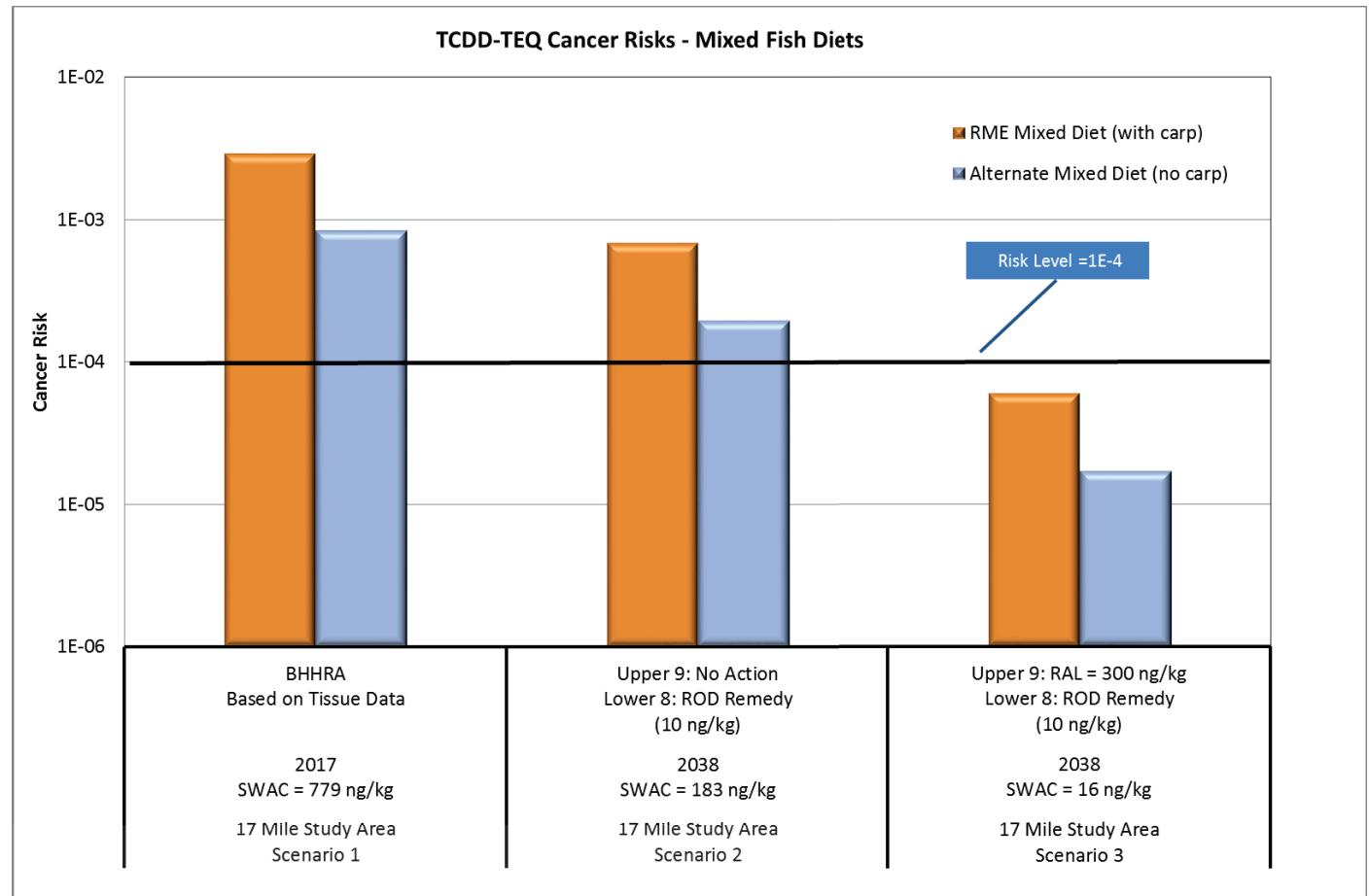
- RM8.3 – 17.4
  - 2038 TCDD concentration (after recovery): 27 ng/kg
  - **96% reduction**
- RM8.3 - 14.8
  - 2038 TCDD concentration: 36 ng/kg
  - **96% reduction**
- Shoals, RM8.3 – 14.8 and RM8.3 - 17.8
  - 2038 TCDD concentration: 31 ng/kg
  - **97.5% reduction**

- Results show that the Phase 1 removal is likely to provide a substantial benefit to the river
- Supports projections that the Phase 1 IR and subsequent MNR are expected to be protective

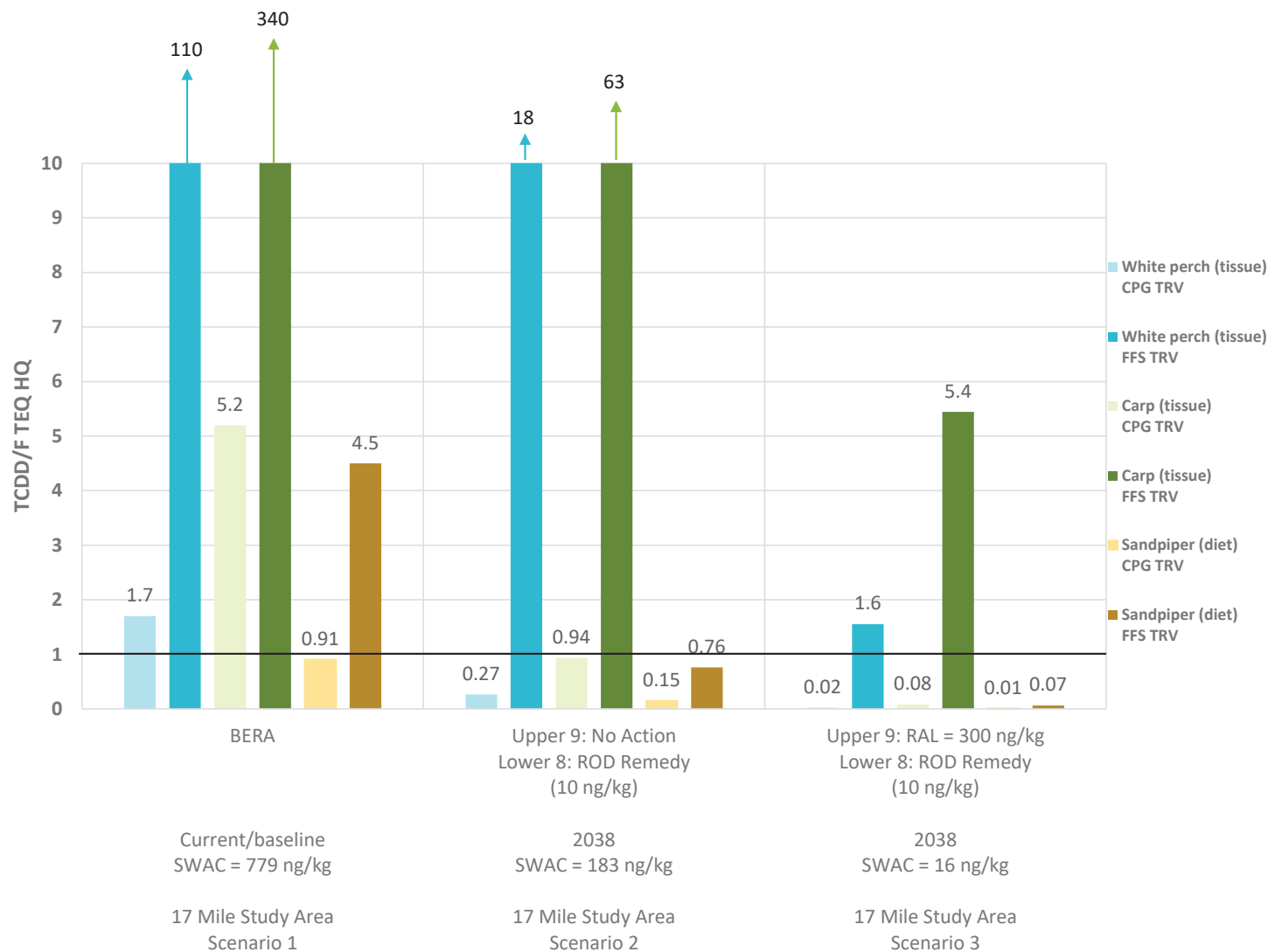
## 2,3,7,8-TCDD SWACs Used in Risk Reduction Calculations

Scenario Number	Scenario Description	2,3,7,8-TCDD SWAC (ng/kg)	Basis for SWAC Used
1	Current baseline conditions	779 ng/kg RM 0-17.4 SWAC	CPG Mapping of "2010" dataset (conditional simulation 37)
2	ROD remedy only (no action in the upper 9 miles)	183 ng/kg RM 0-17.4 SWAC	Area-weighted average of the following: <ul style="list-style-type: none"> <li>For lower 8 miles, EPA ROD model prediction for 2038 for preferred remedy, based on 2016 ROD report figures (10 ng/kg).</li> <li>For upper 9 miles, EPA ROD model No Action simulation presented at the 9/11 Phase 1 meeting (511 ng/kg)</li> </ul>
3	ROD remedy and Phase 1 IR & MNR - Impact on site-wide risk	16 ng/kg RM 0-17.4 SWAC	Area-weighted average of the following: <ul style="list-style-type: none"> <li>For lower 8 miles, EPA ROD model prediction for 2038 for preferred remedy, based on 2016 ROD report figures (10 ng/kg).</li> <li>For upper 9 miles, EPA ROD model 2038 prediction for a 300 ng/kg 2,3,7,8-TCDD RAL in the upper river, presented at the 9/11 meeting (27 ng/kg)</li> </ul>

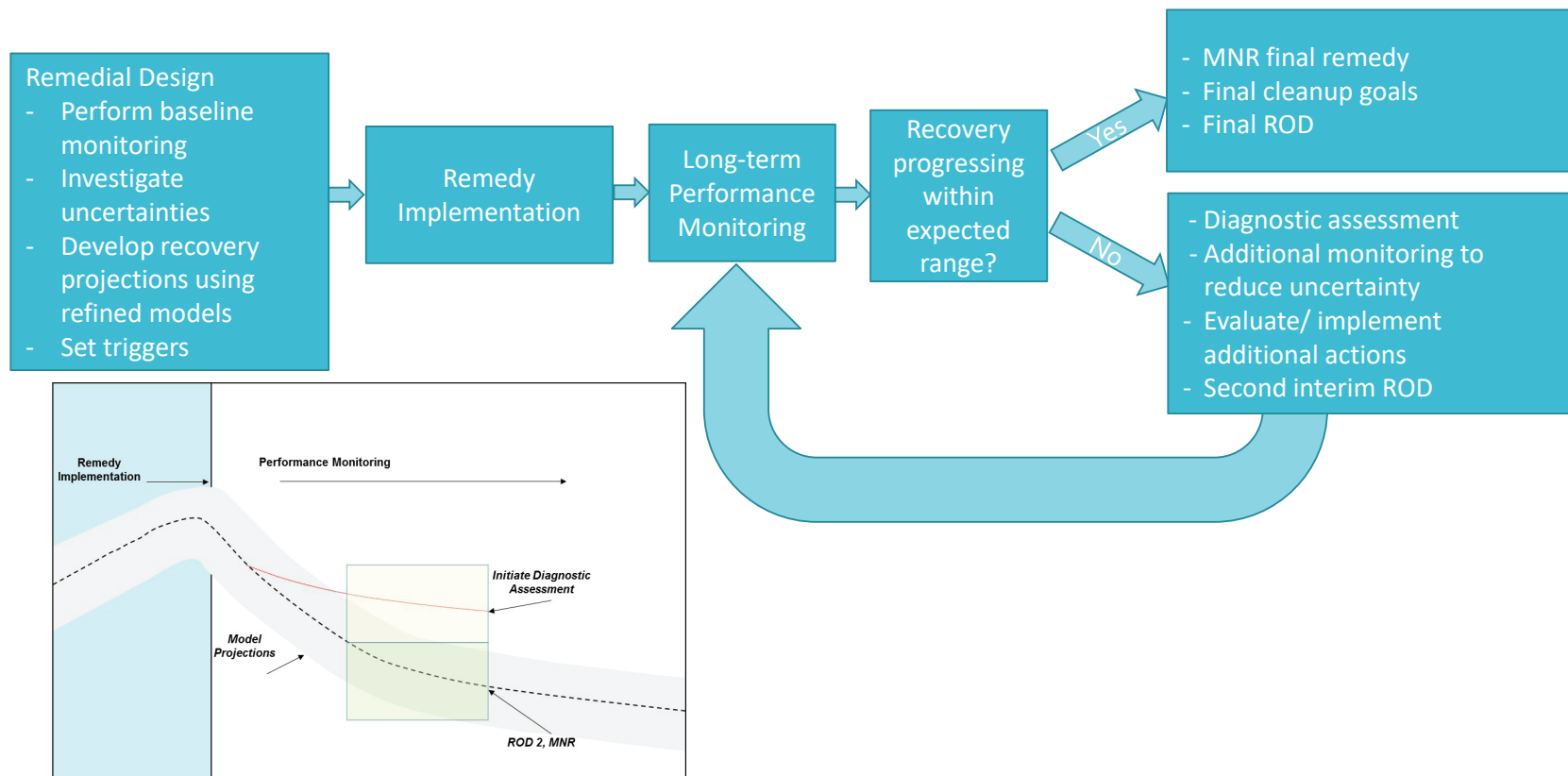
# Projected Cancer Risk Reductions – Adult & Child Angler through 2038



# Projected Ecological Risk Reductions – White perch (tissue) carp (tissue) & sandpiper (diet) through 2038



## Upper 9-mile Adaptive Management Process



## Use of Models

- Complete current modeling effort to support FS
  - Hydrodynamic/Sediment Transport - Calibrated
  - Chemical Fate & Transport – Calibration Nearing Completion
  - Bioaccumulation – Calibrate & Peer Review in 2018
- Use additional data collected in PDI to refine Contaminant Fate and Bioaccumulation models
- Develop expected recovery trajectory and use Performance Monitoring data to assess if river is responding as predicted

# Monitoring Elements of Phase 1 Adaptive Management

- **Baseline monitoring**
  - Establish pre-dredge conditions for comparison with post-remediation conditions
- **Pre-Design Investigation (PDI)**
  - Delineate remedial footprint
  - Support model refinement and updated recovery projections
- **Performance monitoring**
  - Interim monitoring to evaluate short-term system response during remedy implementation
  - Long-term monitoring of system response to support 5-year reviews, and adaptive management

# Adaptive Management Approach

- Criteria and triggers for diagnostic assessment and/or additional action will be based on comparison of performance monitoring data with projected recovery rates
- If the diagnostic assessment identifies:
  - Lack of recovery due to identifiable factors – additional remedial actions will be evaluated/selected
  - Slower than projected but ongoing recovery – revisit CSM and/or model projections, re-evaluate risk reduction timeframes, continue monitoring or consider additional actions

## Diagnostic measures could include:

- Increased monitoring frequency to confirm conditions of concern
- Focused sampling to isolate area(s) of concern
- Bathymetric evaluation
- Model recalibration
- CSM refinement
- Source identification

# Adaptive Management - Preliminary Metrics, Triggers, and Responses

Remedy Objective/ Performance Standard	Primary Monitoring Metrics	Potential Triggers	Possible Response Actions
Reduce tissue concentrations in fish and crab	<ul style="list-style-type: none"> <li>• Baseline and long-term tissue monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Tissue recovery rates are slower than the projected range</li> <li>• Tissue concentrations reach a plateau that will not achieve adequate risk reduction</li> </ul>	<ul style="list-style-type: none"> <li>• Confirmatory tissue sampling</li> <li>• Diagnostic sediment and water column monitoring</li> <li>• Source investigation</li> <li>• CFT/FWM model recalibration</li> <li>• Evaluation/selection of additional source control or in-water actions</li> </ul>
Reduce COC concentrations on water column solids depositing in the upper 9 miles	<ul style="list-style-type: none"> <li>• Baseline and long-term water column monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Water column solids COC concentration recoveries are less than the projected range</li> </ul>	<ul style="list-style-type: none"> <li>• Focused water column monitoring to identify areas of concern</li> <li>• HST/CFT model recalibration</li> <li>• Evaluation/selection of additional source control or in-water actions</li> </ul>
Prevent re-exposure of subsurface sediment with COC concentrations >> RALs in uncapped areas	<ul style="list-style-type: none"> <li>• Baseline and post-construction bathymetry</li> <li>• Future bathymetric surveys in response to high-flow events</li> </ul>	<ul style="list-style-type: none"> <li>• Bathymetry data indicate erosion and re-exposure of buried contamination</li> </ul>	<ul style="list-style-type: none"> <li>• Sediment sampling in potentially eroded/exposed areas</li> <li>• Evaluation/selection of additional actions</li> </ul>

# Potential Monitoring in the Upper 9 Miles

		Bathymetry	Water Column	Biota	Sediment (Recovery Indicator Areas)
Baseline		✓	✓	✓	✓**
Remedy Implementation			✓	✓	
Year 0 Post Construction		✓	✓	✓	✓
Long-term	Primary*	✓	✓	✓	
	Diagnostic		✓	✓	✓

\*Primary components are those identified as triggering metrics

\*\*Sediment sampling will be performed in PDI

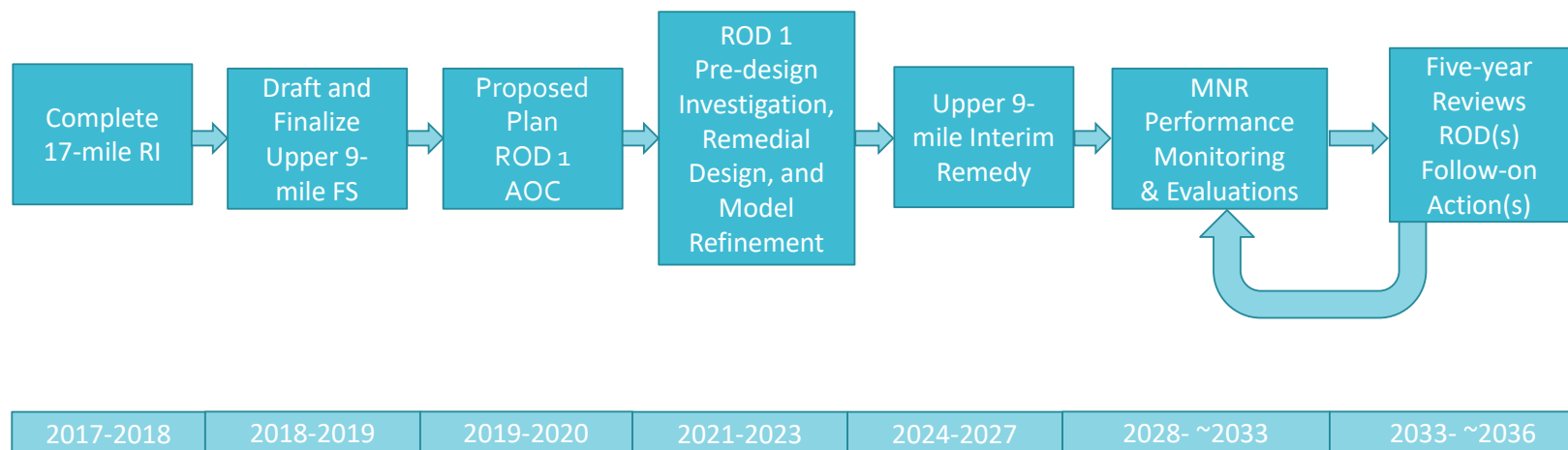
# Baseline Monitoring Objectives

Component	Objectives
Bathymetry/ Side Scan Sonar	<ul style="list-style-type: none"><li>• Update bathymetry (including relevant shallow areas)</li><li>• Update and refine grain size distribution map</li></ul>
Water Column	<ul style="list-style-type: none"><li>• Characterize solids and COC fluxes into and out of the upper 9 mile reach</li><li>• Characterize water column COC concentrations within the reach</li></ul>
Biota	<ul style="list-style-type: none"><li>• Characterize chemical concentrations in fish and crab</li><li>• Understand potential for biota recovery</li><li>• Initiate trend analysis in biota over time</li></ul>

# Long-Term Performance Monitoring Objectives

Component	Objective
Bathymetry	Confirm sediment stability
Water Column	Monitor solids concentration recovery and flux reduction
Biota	Monitor recovery trends
Sediments (RIAs)	Support diagnostic assessment if slow tissue recovery is observed; Characterize post-remedy surficial sediment concentrations to support sediment stability assessment

## Upper 9-mile Plan – An Adaptive & Iterative Approach



## Upper 9-mile Plan – RI/FS Schedule

	2017						2018												2019												2020													
RI/FS Submittals to EPA	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D		
BHHRA	■																																											
BERA						■																																						
RI Report submitted to EPA						■	■																																					
CFT Approved						■																																						
Bioaccumulation Model Peer Review (TBD)									■	■	■	■	■	■																														
EPA/CPG FS Collaboration Meetings, Summary Memos						■	■	■	■	■	■	■	■	■	■	■																												
FS Model Projection Runs									■	■	■	■	■	■																														
Draft FS submitted to EPA																■																												
Final FS submitted to EPA																						■																						
CSTAG/NRRB Review												■	■	■	■	■	■	■	■	■	■																							
Proposed Plan																						■	■	■	■																			
Public Comment Period																										■	■	■	■															
ROD/Responsiveness Summary																												■	■	■	■													
AOC																																				■	■	■	■					

### Assumptions:

- Peer review comments on Bioaccumulation Model will be incorporated into model refinement during the PDI
- CSTAG/NRRB review will be interactive and concurrent with the completion of the FS

## Upper 9-mile Plan – 5-year Review/ROD Schedule

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
RI/FS																					
Proposed Plan, Public Comment, ROD, AOC																					
Baseline Monitoring																					
PDI/RD/Model Refinement																					
Interim Remedy																					
Remedy Implementation Monitoring																					
Long-term Performance Monitoring																					
5-yr Reviews (Diamond Alkali Site-wide)																					
Second ROD (approximate time frame)																					

### 2031 5-yr Review:

- Confirm direct contact and ecological risk reduction is achieved
- Confirm contaminant migration is reduced
- Characterize initial tissue recovery
- Verify sediment stability
- Identify any major deviations from IR performance expectations

### 2036 5-yr Review:

- Confirm tissue recovery
- Confirm water column solids recovery
- Confirm sediment stability

# The Phase 1 IR is Completely Consistent with EPA Guidance

## 2005 Sediment Guidance

- Take other early or interim actions, followed by monitoring before deciding on a final remedy
- Use adaptive management at complex sediment sites...test hypotheses, reevaluating assumptions as new information is gathered
- Phase in remedy selection where F&T is not well understood or there are significant implementation issues
- Consider separating management of source area from other areas

## 2017 OLEM Directive

- Consider early actions during RI/FS
- Develop achievable risk reduction expectations
- Consider the limitations of models
- Consider a structured adaptive management approach
- Use monitoring data to evaluate remedial effectiveness

## 2017 Superfund TF

- Strategy 2: Promote the application of adaptive management at complex sites and expedite cleanup through use of early/interim rods and removal actions
- Recommendation 3: Broaden the use of adaptive management (AM) at Superfund Sites

## CPG's Proposal for an Upper 9- Mile Phase 1 IR

- Phased approach to address the Upper 9-Miles using Adaptive Management
- Proposed RAL of 300 ppt (ng/kg) TCDD and 1 ppm (mg/kg) of Total PCBs
- Approximately 80 Acres from RM 8.3 to RM 14.7
- Remedial Footprint will be reassessed after the PDI
- Performance Monitoring will be used to determine whether the Phase 1 IR and MNR are sufficient and ROD 2 can codify the final cleanup levels, or whether additional actions are required to achieve protectiveness

## The Adaptive Remedy is Scientifically Supported and Certain to be Protective

- Certain:
  - Immediately reduces contaminant levels by an order of magnitude
  - Human Health & Ecological risks significantly & quickly reduced
  - Recovery will be accelerated
- Expected:
  - Meeting the goal of overall protectiveness by the late 2030s for the 17-mile LPRSA.
- Certain:
  - Post remediation monitoring will provide data needed to confirm recovery
  - If additional remediation is needed more will be done